



PUBLIC TRANSPORT TRACKING SYSTEM

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ABSTRACT

In populated countries like India, public transport is essential as many people use it to travel with city bus or public transport vehicle. But problem for this system is people have to wait for hours and hours because they don't know timings and the current status of the bus. Sometimes bus failure causes inconvenience to passengers.

In this study, a bus system is proposed in order to overcome all the current problems like waiting for bus, don't know the route of the bus, what is next stop of the bus etc. In the proposed system, embedded micro-controller, GPS module, trans-receiver and display monitor are used to show information to passengers both in bus and bus stops. The system is divided in three sub parts, first one is for people travelling in bus will get the current position on map, next bus stops, route of the bus. Second one is for people waiting for bus at bus stops get the buses coming to bus stop, people present in that bus, their route and next bus stop. Third one for control room who will get status of all buses and bus stops. We are going to design a real time system which will increase the quality of people's life who travel in public transport.

I. INTRODUCTION

To save limited energy resources, public transport is best solution to minimize fossil fuels usage. There is increased population in developing cities like Pune or metro cities like Mumbai, Chennai, Delhi. So there is a need to provide best services of public transport system. In developing cities many people use their mode of transport as city bus. Since everyone's working schedule is different, they face problems of bus timings. As it is a machine, there may be failure of vehicle which may lead to improper service.

To manage this system is much hard than it seems. There are many bus travelling on different routes. Scheduling of these buses according to passenger count is hard to manage. To overcome these problem and provide proper service to passenger, system should be developed. There is some work that has been done on related topics but still there are some limitations of them which are overcome through this survey.

II. RELATED WORK

In the studies related to this topic [1].Sungur et al. designed a system for tracking the bus and show status of the bus on bus stations. This system is implemented using GPS module and web services. Also the database is maintained to record the information of routes and status of vehicles which are used for public transport system. Application was developed to manage such information. The administrator of the system easily monitored public transport traffic. Hardware used in this system are Friendly ARM Micro2440 embedded device, GPS module containing a SiRFstar3 GPS chip, server for database. Software used in system are Windows CE 6.0 OS for Friendly ARM Micro2440,

Microsoft Visual Studio 2008, Oracle database management system. System worked on two cycles viz. vehicle information cycle and station information cycle as shown in fig 1.1(a) and (b) respectively. Information shown on bus station screen in table format. First row of table is name of current bus station. Next row shows name of bus coming to station and its arrival time, after that next 3 row contains nearest bus to that station and their arrival time. The systems need internet connection as it uses web services.

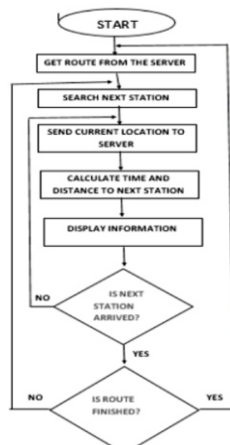


Fig II.1(a) vehicle information cycle

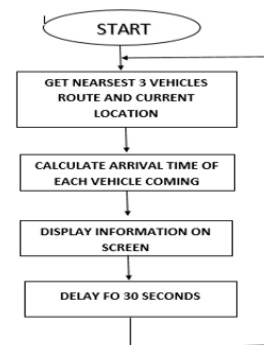


Fig II.1(b) station information cycle

[2]. Pankaj Verma et al. designed and developed the system on GPS-GSM based tracking with google map based monitoring. System has GPS module which receives coordinates from the satellites and sends it to the web based application which shows the current position of target which is vehicles used in public transport system in our case. The system locates the goal anytime and anywhere and any weather condition if one have the GSM mobile. Hardware used in the system are AT mega microcontroller, GPS module, GSM module 16*2 LCD module and power supply. Software used in the system are wamp server, web application and software to decode NMEA protocol. The system contains two units one is transmitting unit and another is monitoring unit. Transmitting unit is set in the target vehicle and consist of GPS module, GSM module, and LCD module connected to AT mega microcontroller. GPS and GSM module connected through RS232 Protocol. GSM module requires sim card for two-way communication just like telephone. Monitoring unit consist of GSM mobile and Web application. The units are shown in fig 1.2(a) and (b) respectively. The system only monitors the target not manage or store data anywhere. The system requires GSM mobile and internet to check for current location.

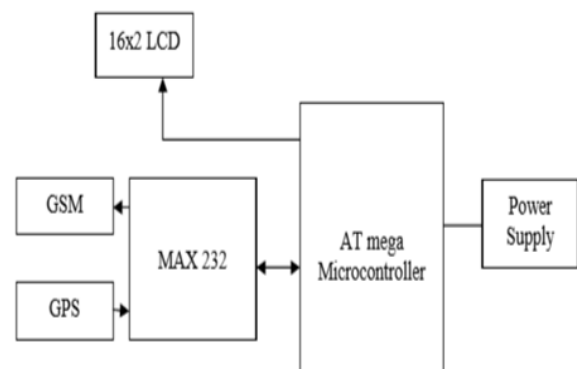


Fig II.2(a) Transmitting unit

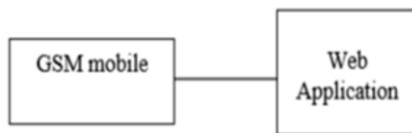


Fig II.2(b) Monitoring unit

III. PROPOSED METHOD

Problem with above two systems are they all need connected to internet. What if someone has no internet or no such device that can be connect to internet. The system developed by Pankaj Verma et al. only monitor the or tack the vehicle or target. This system needs GSM mobile or Web based application for communication. We are trying to develop the system which is available to any kind of passenger. The system can be developed which minimize the above limitation. So proposed system has 3 units. First for administrator, second for passenger present in vehicle of public transport system, and third for passenger waiting for vehicle of public transport system at bus stations. Architecture of proposed system is shown in fig III.1

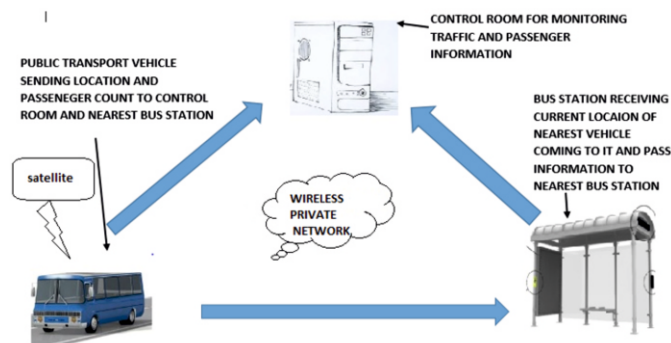


Fig III.1 Proposed architecture of public transport tracking system

A. CONTROL UNIT

Administrator of the system control and manage the system based on the information provided by the public transport system's vehicle and bus station. System formed the Ad-Hoc network by connecting every bus station and control room. Route number is assigned to every vehicle of public transport system which can be change only by administrator. Control unit maintain database to store the information of all routes and corresponding vehicle number to routes. Also database also contain information of vehicle location at particular time. On the basis of database information administrator can manage the traffic and control the system.

B. VEHICLE UNIT

Vehicle of public transport system is equipped with embedded system. GPS module, display screen and long range transmitter and receiver embedded on AT mega328 microcontroller. AT mega328 microcontroller gets location of vehicle from GPS module and transmit it to nearest bus station. As every bus station and control unit is interconnected by Ad-Hoc network, the information is pass on to next bus station and control unit. Vehicle transmit passenger count to the next bus station so that passenger on next bus stations predict for place to seat in vehicle. Display screen in vehicle shows next bus station information, current position of vehicle and route of the vehicle.

C. BUS STATION UNIT

Bus station also equipped with embedded system. Display screen, long range transmitter and receiver are embedded on AT mega328 microcontroller. Bus station unit collects information from next bus station and vehicles and display useful information on bus station display screen. Remaining information is pass on to nearest bus station. Bus station also get information about vehicle breakdown from vehicle which is pass to control unit and after then control unit can send extra vehicle for proper service.

IV. CONCLUSION AND FUTURE SCOPE

Though this proposed study, it was goal to increase life quality of people traveling by public transport systems. Also system will help to management staff for providing best service to the passengers. Based on system control unit can manage and improve the flexibility of system. Passenger inside get the arrival time of next bus station and current location of bus and route of the bus. Passenger waiting for bus get the status of all nearest bus coming to that station with its predicted arrival time. Control unit monitor and manage the system and store all information of routes and current location of each bus

REFERENCES

- [1] C. Sungur, I. Babaoglu and A. Sungur, "Smart Bus Station-Passenger Information System," Information Science and Control Engineering (ICISCE), 2015 2nd International Conference on, Shanghai, 2015, pp. 921-925.

- [2] Pankaj Verma , J.S Bhatia, "DESIGN AND DEVELOPMENT OF GPS-GSM BASED TRACKING SYSTEM WITH GOOGLE MAP BASED MONITORING," International Journal of Computer Science, Engineering and Applications (IJCSEA) Vol.3, No.3, June 2013
- [3] El-Medany W. Al-Omary A., Al-Hakim R., Al-Irhayim S., Nusaif M., "A Cost Effective Real-Time Tracking System Prototype Using Integrated GPS/GPRS Module", 2010 Sixth International Conference on Wireless and Mobile Communications, ss. 521-525, 20-25 Eylül, Valencia, 2010.
- [4] G. Mintsis , S. Basbas, P. Papaioannou, C. Taxiltaris, I.N. Tziavos "Applications of GPS technology in the land transportation system" European Journal of Operational Research 152 (2004) 399-409
- [5] Parvez, M.Z.; Ahmed, K.Z.; Mahfuz, Q.R.; Rahman, M.S., "A theoretical model of GSM network based vehicle tracking system," Electrical and Computer Engineering (ICECE), 2010 International Conference on , vol., no., pp.594,597, 18-20 Dec. 2010
- [6] Le-Tien, T.; Vu Phung-The, "Routing and Tracking System for Mobile Vehicles in Large Area," Electronic Design, Test and Application, 2010. DELTA '10. Fifth IEEE International Symposium on , vol., no., pp.297,300, 13-15 Jan. 2010
- [7] Datasheet of Atmega 16 microcontroller, Rev. 2467X-AVR-06/11